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Dotsch, Ron; Wigboldus, Daniël H.J.

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Virtual Prejudice

Ron Dotsch and Daniël H. J. Wigboldus

Behavioural Science Institute

Radboud University Nijmegen

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Both authors contributed equally to this article. Correspondence concerning this chapter should be addressed to: Ron Dotsch or Daniël Wigboldus, Radboud Immersive Virtual Environment Research Lab (RIVERlab), Behavioural Science Institute, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands, r.dotsch@bsi.ru.nl or d.wigboldus@bsi.ru.nl.

Abstract

According to recent theorizing in social psychology, social behavior is controlled not only by reflective, but also by impulsive systems. The latter is based on associative links that may influence behavior without intent. The current study examined how prejudiced implicit associations affect physiological and automatic behavioral responses. Our native Dutch participants were immersed in a virtual environment in which they encountered virtual persons (avatars) with either white or Moroccan facial features. In line with our predictions, participants maintained more distance and showed an increase in skin conductance level when approaching Moroccan avatars as opposed to white avatars. Participants' implicit negative associations with Moroccans moderated both effects. Moreover, evidence was found that the relation between implicit prejudice and distance effects was fully mediated by skin conductance level effects. These data demonstrate how prejudiced implicit associations may unintentionally lead to impulsive discriminatory responses.

Keywords: prejudice, stereotypes, implicit associations, virtual reality, personal distance, skin conductance

Virtual Prejudice

In most western societies the cultural norm nowadays is to prevent prejudice and discrimination. In line with this norm, overt discrimination on the basis of ethnicity, religion, sexual orientation, gender, political preference and so on has declined over the past decades (e.g., Schuman, Steeh, Bobo, & Krysan, 1997). Nevertheless, strong indicators of discrimination still can be found, for instance on the job-market (e.g., Dovidio & Gaertner, 2000). Social cognitive research suggests that such discriminatory behavior may result not only from discriminatory motivation, but also from a variety of unintentional, categorization-related judgment errors characterizing normal human functioning (e.g., Allport, 1954; Krieger, 1995; Schneider, 2004). The current research aimed to demonstrate, in a highly controlled virtual social environment, the impulsive physiological and behavioral responses that may result from these automatic categorization processes.

Impulsive Prejudiced Behavior

According to recent theorizing in social psychology (for an overview see, Strack & Deutsch, 2004), social behavior is controlled not only by a more deliberative or reflective system but also by a more spontaneous or impulsive system. The latter is based on associative links that may influence behavior unintentionally through the spread of activation to behavioral schemata. A host of research on these associative links has demonstrated that implicit, prejudiced associations and stereotypes can be automatically activated (e.g., Devine, 1989; see, Blair 2002; Fazio & Olson, 2003; Greenwald & Banaji, 1995). Importantly, people may differ in the extent to which they possess prejudiced implicit associations (implicit prejudice), and these differences can be measured with indirect tests such as the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998; see Amodio & Devine, 2006).

Subsequently, an important question becomes to what extent these implicit prejudiced associations will affect people's responses towards the target. In line with the impulsive – reflective model it has been found that the friendliness of white participants' impulsive, non verbal behaviors towards a Black interaction partner was best predicted by an indirect measure of Whites' implicit attitudes towards Blacks whereas their more reflective, verbal behaviors were best predicted by their self-reported racial attitudes (Dovidio, Kawakami, Gaertner, 2002).

The Role of Affect

To explain discriminating behaviors, social psychological research has focused mainly on social cognitive processes and concepts, such as categorization and stereotyping (see Blair, 2002). However, especially with respect to impulsive prejudiced behaviors, basic affective processes seem to play a crucial role. For instance, recent neuroscientific research measured activation of the amygdala, a subcortical structure often associated with fear and anxiety (LeDoux, 1996, 2000) in response to Black versus White faces (Phelps, O'Connor, Cunningham, Funayama, Gatenby, Gore, & Banaji, 2000). Results showed that amygdala activation correlated highly with implicit prejudice as measured by a race IAT. Importantly, the amygdala and its surrounding structures are strongly linked to neural regions associated with approach-avoidance responses (Davis & Whalen, 2001). This suggests that implicit negative evaluations of others (based on personal experience, cultural knowledge or both) are supported by subcortical structures and, as a result, are expressed in basic approach-avoidance behaviors. In line with this reasoning is has been found that, for instance, implicit prejudice (race IAT) uniquely predicts seating distance from a chair containing the belongings of a presumed African American person (Amodio & Devine, Exp. 3, 2006).

The influence of prejudice on basic affective processes also has been demonstrated using differences in skin conductance level. Skin conductance level is considered an indicator of basic affective processes and has shown to be affected by the ethnicity of an interaction partner (for an overview, see Guglielmi, 1999). Interestingly, skin conductance level is related to amygdala activation based on fear representations (e.g., Cheng, Knight, Smith, & Helmstetter, 2006; Phelps, O'Connor, Gatenby, Gore, Grillon, & Davis, 2001).

From Implicit Prejudice to Behavior

It seems that impulsive prejudiced behavior starts with learned, prejudiced, implicit evaluations that will be automatically activated when a stigmatized target is present. This activation results in a basic affective reaction that will be accompanied by an impulsive, aversive behavioral reaction towards this target (see Amodio & Devine, 2006). Although others have laid out the separate pieces of this impulsive prejudice puzzle, as yet, we are not aware of a single study examining a more complete process. In the present study we measured implicit negative associations towards Moroccan-Dutch people (Dutch citizens from Moroccan descent), currently a strongly stigmatized group in the Netherlands (see, Verkuyten & Zaremba, 2005). We expected implicit prejudice to be related to an avoidance reaction towards Moroccan-Dutch people. That is, we predicted that our native Dutch participants would keep more distance when encountering a target with typical Moroccan facial characteristics than when encountering a target with the white facial characteristics that are typical for native Dutch people, and that this difference would be associated with participants' level of implicit prejudice. Moreover, we expected that this relation between implicit prejudice and behavior would be mediated by participants' skin conductance level (SCL) during the encounter with the target. In the current research, we chose SCL as an indicator of basic affective reactions, the advantage being that SCL could be measured during participants' behavioral responses.

To test our predictions, we designed an experiment using a computer generated immersive virtual environment (see Blascovich, Loomis, Beall, Swinth, Hoyt, & Bailenson, 2002). Immersive virtual environment technology (IVET) makes it possible to create standardized virtual confederates (called avatars in the IVET literature), which differ only in ways controlled by the experimenter. Moreover, IVET offers a perfect unobtrusive measure of personal distance, because the computer tracks participants' movements continuously.

In the current study we used a paradigm similar to the paradigm used by Bailenson, Blascovich, Beall and Loomis (2001). Participants immersed in a virtual environment were put in the vicinity of a male avatar, who was wearing a nametag on his chest and a label with a number on his back. Participants were asked to walk around the avatar and remember the combination of the name and the number. The ethnicity of the avatar varied within-participants, being either white or Moroccan. Participants' position and skin conductance were recorded on-line during the entire encounter. Afterwards, participants' implicit evaluations of Moroccans were measured.

Method

Participants

Twenty-one female and twelve male, native Dutch, psychology students from the University of Amsterdam participated in this study in return for course credit (mean age 21.37, *SD* = 4.23).

Design

The experiment consisted of a single factor (avatar ethnicity: white vs. Moroccan) within-participants design. Participants were immersed in a virtual environment in which they consecutively encountered twelve male avatars near a bus stop. Avatar ethnicity was manipulated by varying the appearance of the avatars (see Figure 1) and by using either a typical native Dutch or Moroccan name on the nametag. Each Moroccan avatar had the same face, and each white avatar had the same face. On each trial the color of the clothing of the avatars varied.

Materials

The experiment took place in the CAVE Automated Virtual Environment (CAVE) at Stichting Academisch Rekencentrum Amsterdam (SARA). The CAVE consisted of four screens (on three walls and one on the floor) on which two alternating images were projected. Participants wore shutter glasses that were in synchronization with the images on the screen, so that the left eye would only perceive images meant for the left eye, and the right eye only images meant for the right eye, thus creating an illusion of three-dimensional perception. A sensor on top of the shutter glasses transmitted participants' current location to a computer cluster, which then calculated the correct images to be projected on the screens.

Procedure

Participants arrived at SARA individually. They were explained that in the CAVE they would encounter twelve avatars near a bus stop, one after another. Each avatar would wear a unique nametag on his chest and a numbered label on his back. Participants were instructed to look for and try to remember the name and number combination of each avatar. Subsequently, participants explored an empty virtual bus stop to get used to the environment. After this, the experiment started and participants first were presented with two white avatars to get used to the avatars (for a similar procedure see, McConnell & Leibold, 2001; Vrana & Rollock, 1998). Subsequently, the remaining 10 trials (four white and six Moroccan avatars) were presented in random order. Avatars were positioned with the side of their body directed towards the participants' starting point. Avatars remained in place except for their heads, which followed participants around in a realistic way within a range of 60 degrees to the left and 60 degrees to the right. That is, avatars kept their heads turned towards participants until participants disappeared from the avatar's view behind the avatar's back. After each trial, participants walked back to the starting point. After the virtual reality trials, participants received a bogus paper-and-pencil recall test for the name/number combinations.

Subsequently, while standing in front of an avatar, participants were asked to indicate on 7-point Likert scales ranging from 1 (*complete disagreement*) to 7 (*complete agreement*) for both types of avatars separately the extent to which they agreed that he had a white or Moroccan appearance. Also, they were asked for both the Moroccan and the white avatar to indicate their agreement with the statement: “This person seems to be likeable to me”. Finally, explicit and implicit prejudice towards Moroccans was measured.

Measures

Average distance. The average distance to the avatar during each trial functioned as a behavioral measure of approach. To be able to calculate average distance, the position of the participant was recorded continuously at approximately 14 Hz.

Skin conductance. Participants’ skin conductance level (SCL) was recorded with the Vrije Universiteit Ambulant Monitoring System (VU-AMS). The VU-AMS has the size of a walkman, leaving participants’ freedom of movement intact. Two silver-silver chloride electrodes were attached to the middle finger and ring finger (on the volar surfaces of the medial phalanges) of the non-dominant hand. The VU-AMS measured SCL by passing a small current through the surface of the skin between the two electrodes, at a constant voltage of 0.5 V. The measurement ranged between 1 to 100 µS, with a resolution of 0.0125 µS. SCL was sampled every 500 ms.

Implicit prejudice. After the VR trials, we used a single target implicit association test (ST-IAT; see Bluemke & Friese, in press; De Liver, van der Pligt, & Wigboldus, 2007) to indirectly measure how strongly participants associated Moroccan names with positive and negative words. Participants were asked to classify Moroccan names (e.g. Achmed, Mustafa) and positive and negative words (e.g., love, peace, war, pain) with two response keys (*left* and *right*) in a congruent and an incongruent block. The congruent block consisted of classifying 10 Moroccan names and 10 negative words with the left key, and 20 positive words with the right key. The incongruent block consisted of classifying 10 Moroccan names and 10 positive words with the right key, and 20 negative words with the left key. A practice block preceded each block, with 5 Moroccan names and either 5 negative and 10 positive words (congruent practice block) or 10 negative and 5 positive words (incongruent practice block). The order of block congruency was counter-balanced between participants. Participants always started with a general practice block of 10 positive words, 10 negative words and no names. Within blocks, all stimuli were presented in random order. Better performance in terms of shorter response latencies on the congruent block than on the incongruent block was assumed to indicate stronger negative than positive associations with Moroccan names (see, Greenwald, et al., 1998).

Explicit prejudice. We measured explicit prejudice towards Moroccans with eight evaluative statements (e.g., “I like Moroccans”; “I dislike Moroccans”; Cronbach’s α =.94). Participants indicated their agreement with each statement a 7-point Likert scale ranging from 1 (*complete disagreement*) to 7 (*complete agreement*). Items were recoded in such a way that higher scores reflect more positive evaluations.

Results

Manipulation checks. The Moroccan avatar was judged to have a more Moroccan (M = 6.18, SD = 0.77) appearance than the white avatar (M =1.82, SD = 1.36), $t(32) = 17.78$, d = 3.96, $p < .001$. The white avatar was judged to have a more white (M = 4.79, SD = 1.67) appearance than the Moroccan avatar (M = 1.42, SD = 0.75), $t(32) = 10.95$, d = 2.60, , $p <$ .001. Our ethnicity manipulation thus worked. Interestingly, when explicitly asked, participants rated the Moroccan avatar (M = 4.58, SD = 1.25) as more likeable than the white avatar (M = 3.85, SD = 1.22), $t(32) = 3.20$, d = 0.59, $p < .01$.

Average distance. Distances reflect the average distance from the sensor on top of a participant’s shutter glasses to the centre of an avatar during a trial (reported in centimeters).

To calculate average distance to an avatar, we used only the data points at which participants were in front of the avatar. That is, when the avatar's face was visible to the participant. We found a reliable effect of avatar ethnicity. Participants maintained more distance to Moroccan avatars (M = 104.92, SD = 14.89) than to white avatars (M = 100.79, SD = 14.44), $t(32)$ = 3.82, d = 0.28, $p < .001$.

Skin conductance. SCL is reported in µS. We found a reliable effect of avatar ethnicity. Participants had higher mean SCLs during trials with a Moroccan avatar (M = 11.75, SD = 6.24) than during trials with a white avatar (M = 11.21, SD = 5.96), $t(32)$ = 3.02, d = 0.09, $p < .01$.

Implicit prejudice. We calculated our measure of association strength analogous to Greenwald et al. (1998). Practice blocks and the first two trials of each block were excluded from analysis. Latencies were capped to a range between 300 ms and 3000 ms. Analyses were performed on log-transformed latencies, but untransformed mean latencies are reported (in milliseconds). Participants had longer latencies in the incongruent block (Moroccan names and positive words on the same key; M = 615, SD = 122) than in the congruent block (Moroccan names and negative words on the same key; M = 579, SD = 110), $t(32)$ = 4.01, d = 3.13, $p < .001$. This indicates that participants on average had stronger negative than positive associations with Moroccan names.

Explicit measure. On our explicit prejudice scale (higher scores reflect more positive evaluations) participants rated Moroccans somewhat above the midpoint of the scale (M = 4.92; SD= 1.18).

Relations between measures. We expected not only that our native Dutch participants would keep more distance when encountering a Moroccan avatar than when encountering a white avatar, but also that this difference would be predicted by the strength of negative implicit associations participants have with Moroccans. Moreover, we predicted that this relation between implicit prejudice and behavior would be mediated by participants' SCL during the encounter with the target. To test these hypotheses we conducted a mediation analysis (Baron and Kenny, 1986). In this case we estimated and tested mediation and moderation in a within-subject design. In line with the suggestions of Judd, Kenny, and McClelland (2001) we used difference scores to represent the within subject-effect of avatar ethnicity on distance (i.e., the dependent variable) and SCL (i.e., the mediator) in multiple regression analyses.

First, an initial multiple regression analysis revealed that the extent to which avatar ethnicity affected distance was significantly predicted by the implicit prejudice measure, $\beta = .40$, $p = .02$. Second, in a similar vein, a regression analysis demonstrated that the extent to which avatar ethnicity affected SCL was predicted by the implicit prejudice measure, $\beta = .54$, $p < .001$. A third and final regression analysis examined to what extent implicit prejudice predicted the effect of avatar ethnicity on distance when controlling for the effect of avatar ethnicity on SCL. Once the difference score representing the effect of avatar ethnicity on SCL had been entered, the effect of our implicit prejudice measure on the difference score representing the effect of avatar ethnicity on distance dropped to non-significant, $\beta = .07$, $p = .66$, whereas the SCL difference itself predicted a significant amount of the variance in distance as a function of avatar ethnicity, $\beta = .60$, $p < .001$ (see Figure 2).[1] In sum, these analyses provide evidence for the expected mediation effect. The effect of implicit prejudice on differences in distance was fully mediated by the effect of implicit prejudice on SCL.[2] Interestingly, when added, our explicit prejudice measure did not predict a significant amount of the variance in any of the analyses described above.

Discussion

Using IVET, we demonstrated that native Dutch participants on average kept more distance towards avatars with a Moroccan appearance compared to avatars with a white appearance. Also, participants showed a small but reliable increase in skin conductance levels when approaching a Moroccan avatar as compared to when approaching a white avatar. Both the difference in distance and in skin conductance were predicted by participants' implicit prejudice towards Moroccans as measured with the IAT. Interestingly, mediation analyses suggested that skin conductance fully mediated the effect of implicit prejudice on distance.

It should be noted that partial evidence was found also for the reversed causal path (see Footnote 2). In the current experiment both distance and SCL were measured dependent variables. Future experimental research may manipulate either interpersonal distance or basic affective responses to get more insight into the causal direction(s) of the current effect. Importantly, the theoretically predicted, mediational path analysis from implicit prejudice via basic affective responses to our behavioral measure was fully supported by the current data.

It is noteworthy that the current effects were found using virtual targets. Of course, at a more reflective level, participants were aware of the "virtualness" of our avatars. Nevertheless, at a more impulsive level, participants were "fooled" by our virtual reality. None of the participants walked through an avatar (despite this being the quickest route from the front to the back of the avatar). More importantly, participants showed a reliable increase in SCL and on average kept more distance as a function of virtual facial features. It is like standing on the glass floor in the CN tower in Toronto. At a reflective level you are aware that the floor will never break under you weight. However, at an impulsive level, your basic affective systems give you a warning signal that (at least temporarily) will prevent you from stepping on the glass floor. Our impulsive system does not differentiate between virtual or real. It simply quickly reacts to its input.

It should be noted that the distance and skin conductance effects reported are reliable but small. The average difference in distance throughout a trial was around 4 centimeters. An obvious question is to what extent a real-life actor and target might be aware of these small differences in interpersonal distance between them. However, from the current point of view a more important question for future research is the extent to which these small but subtle differences affect both parties unconsciously, at a more impulsive level (see Word, Zanna, & Cooper, 1974).

The current findings are in line with recent neuroscientific evidence that suggests that implicit negative evaluations of others (based on personal experience, cultural knowledge or both) are supported by subcortical structures and, as a result, may be expressed in basic approach-avoidance behaviors (e.g., Amodio & Devine, 2006; Phelps et al., 2000). The current data support the idea that an implicit prejudice process starts with learned, prejudiced, implicit evaluations that are automatically activated when a stigmatized target is present. This activation is accompanied by a basic affective reaction, which in turn results in an aversive, uncontrolled behavioral reaction towards this target. Note in this respect that our explicit prejudice measure was unrelated to this process and participants, when explicitly asked, did not judge the white avatar as more likable than the Moroccan one. Future research may include a measure of amygdala activation to get more insight into the basic affective reactions underlying the current results.

Walter Lippmann (1922, p. 65) noted that the hallmark of the perfect stereotype is "...that it precedes the use of reasons; is a form of perception, imposes a certain character on the data of our senses before the data reach the intelligence." The current findings corroborate his notion and demonstrate how, based on associative links, our impulsive system leads to unintended discriminatory behavior.

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Footnotes

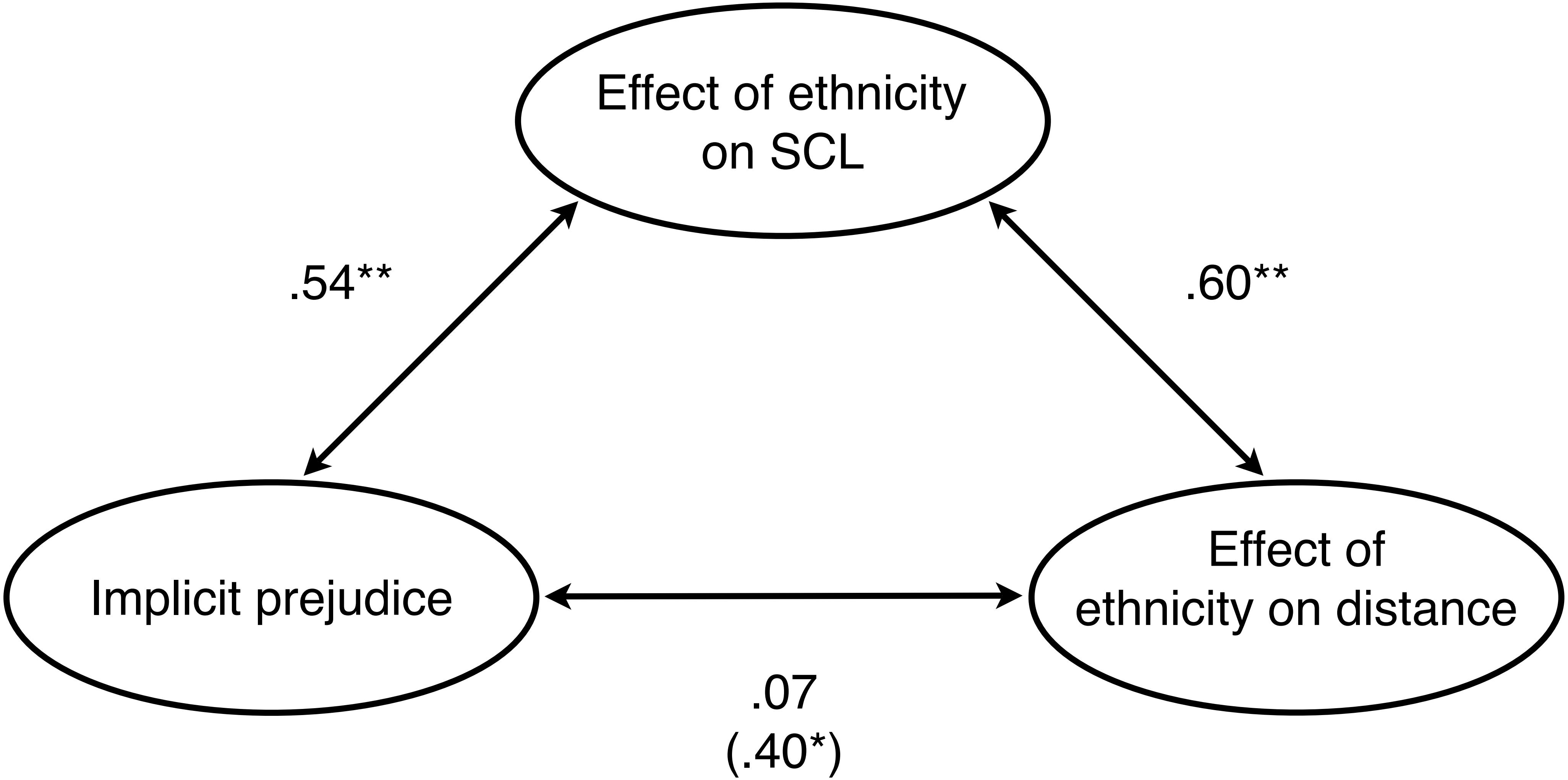
1. In preliminary analysis we added also the product of the two predictors to test for interaction effects. No such effects were found.

2. We conducted an additional mediational analysis to test for the alternative causal direction: The effect of implicit prejudice on differences in interpersonal distance may mediate the effect of implicit prejudice on differences in SCL. In this case evidence was found for partial mediation. To some extent differences in distance due to avatar ethnicity seem to have affected differences in SCL.

Figure Captions

Figure 1. The white (left) and Moroccan (right) faces that were created with Poser 6 software.

Figure 2. Path analyses depicting the mediating role of the effect of ethnicity on skin conductance level (SCL) in the effect of implicit prejudice on the distance effect. The standardized beta value for the direct effect is given in parentheses. * $p < .05$; ** $p < .001$.


Effect of ethnicity on SCL
.54**
.60**
Implicit prejudice
Effect of ethnicity on distance
.07
(.40*)